

Open Research Online

The Open University's repository of research publications and other research outputs

High concentration of 28,30-bisnorhopane and 25,28,30-trisnorhopane at the PETM in the Faroe-Shetland basin

Conference or Workshop Item

How to cite:

Watson, Jonathan and Kelley, Simon (2009). High concentration of 28,30-bisnorhopane and 25,28,30-trisnorhopane at the PETM in the Faroe-Shetland basin. In: 24th International Meeting on Organic Geochemistry, 6-11 Sep 2009, Bremen, Germany.

For guidance on citations see [FAQs](#).

© 2009 24th IMOG, Bremen

Version: Version of Record

Link(s) to article on publisher's website:

http://www.marum.de/Binaries/Binary42310/IMOG2009_AbstractBook.pdf

Copyright and Moral Rights for the articles on this site are retained by the individual authors and/or other copyright owners. For more information on Open Research Online's data [policy](#) on reuse of materials please consult the policies page.

oro.open.ac.uk

HIGH CONCENTRATION OF 28,30-BISNORHOPANE AND 25,28,30-TRISNORHOPANE AT THE PETM IN THE FAROE-SHETLAND BASIN

Jonathan S. Watson^{1,2}, David W. Jolley³, Simon P. Kelley²

¹Planetary and Space Sciences Research Institute, The Open University, Milton Keynes, MK7 6AA, UK
(j.watson@open.ac.uk)

²Department of Earth and Environmental Sciences, The Open University, Milton Keynes, MK7 6AA, UK

³Department of Geology and Petroleum Geology, University of Aberdeen, AB24 3UE, UK

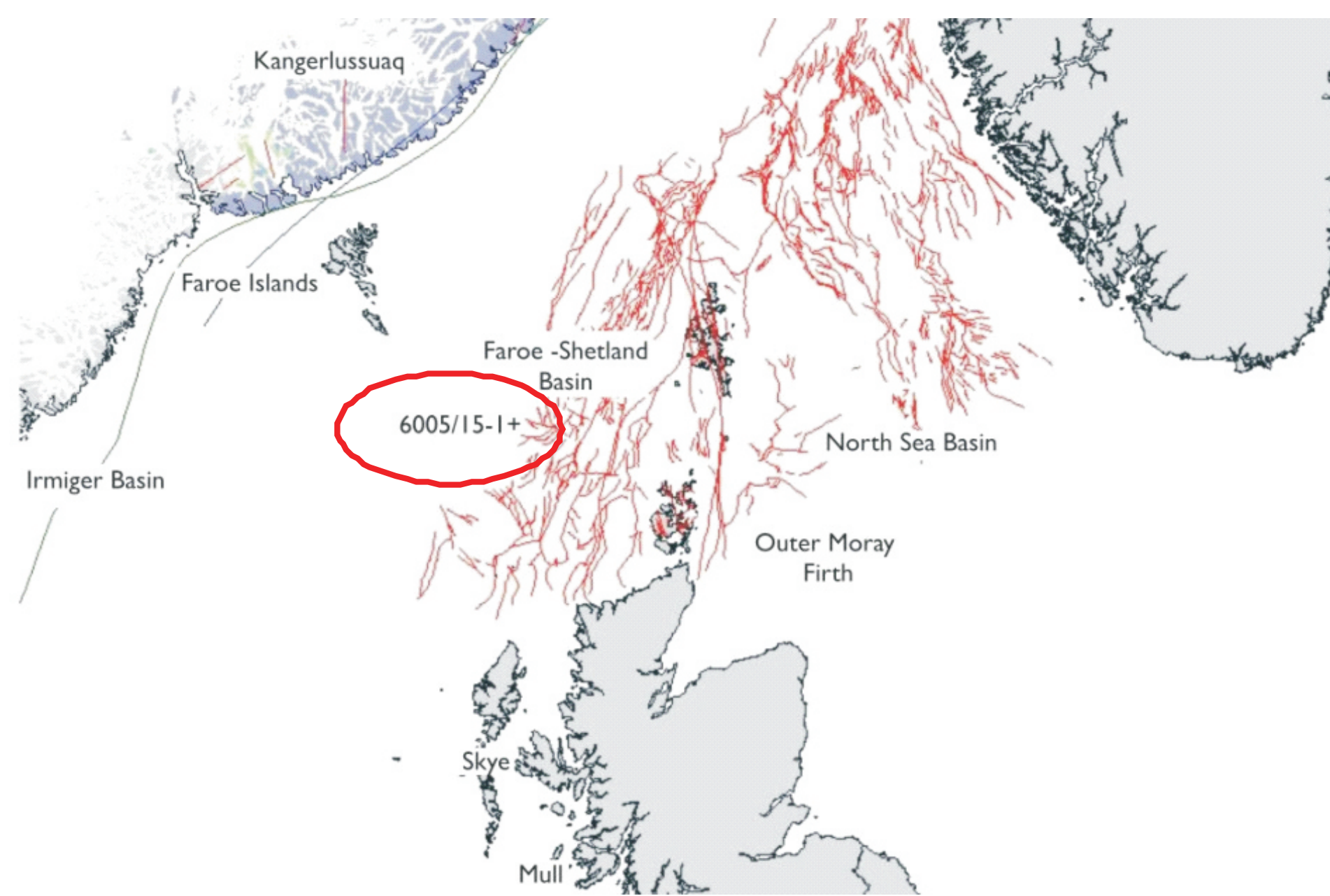


Figure 1: Location of analysed core

RESULTS AND DISCUSSION

We have been able to identify variation in a range of compounds present in the core, their variation reassuringly follow associated palynological changes and indicate a mixture of marine and terrestrial inputs, which include abundant plant derived diterpenoids (Figure 2). PETM events, are recorded in both bulk and compound specific carbon isotope excursions of -2 to -3‰ (Figure 3) and by a change in palynology which is consistent with other reports.

Demethylated hopanes 28,30-bisnorhopane (BNH) and 25,28,30-trisnorhopane (TNH), are present in relatively low concentrations throughout the core but are at high concentrations at the PETM (Figure 3 & 4). The actual bacteria responsible for TNH and BNH in geological samples has so far not been determined [1]. However, BNH and TNH are thought to be produced by chemoautotrophic bacteria, their presence in rocks which formed in inner neritic environments may indicate strong upwelling or perhaps ocean overturn.

Extreme shallowing of the CCD is well documented at the PETM, but there has previously been no clear indicator for a potential ocean overturn, although this has previously been mentioned as a potential driver for the event. While this has been dismissed as a mechanism driving the PETM events because it was envisaged as a local basin overturn, and can not explain the global extent of the PETM [2], we propose that the presence of TNH and BNH indicates ocean overturn may have played a role in the PETM. While it may not explain the isotopically light carbon in its entirety, stratification and ocean overturn may be a consequence of high temperatures, since palynological evidence indicates very low salinity conditions in surface waters at the PETM in this core.

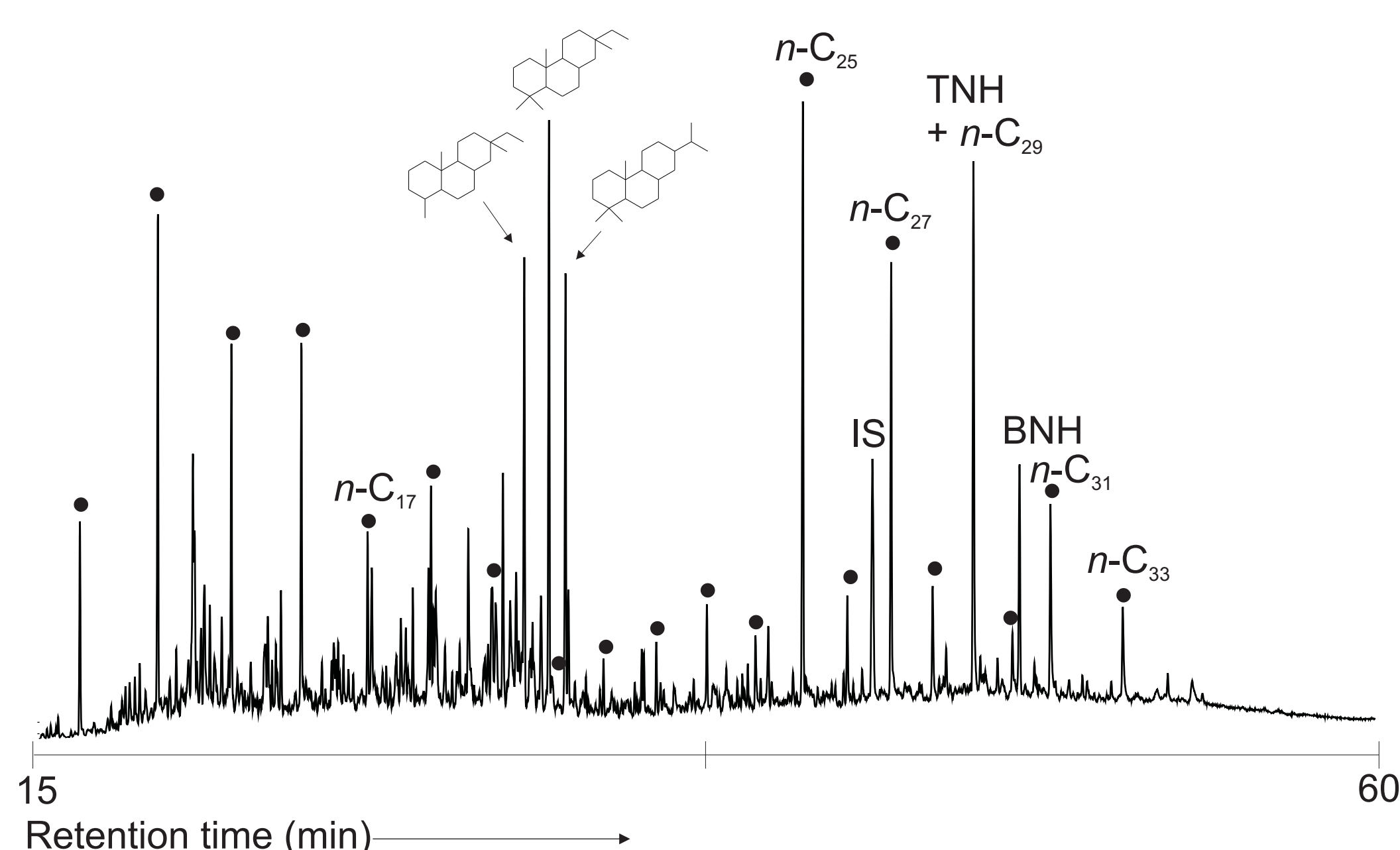


Figure 2: Total ion current for saturate fraction at the PETM carbon isotope excursion (sample 2280).

REFERENCES

- [1] Peters et al. (2005) The Biomarker Guide, Cambridge University Press, UK
[2] Cohen, A.S. et al. (2007) J. Geol. Soc. 164, 1093-1108

INTRODUCTION

Petroleum exploration in the Faroe-Shetland basin has resulted in the drilling of wells some of which contain expanded sections across the Palaeocene Eocene thermal maximum event (PETM). Here we present data from a Faroe – Shetland Basin well (Figure 1).

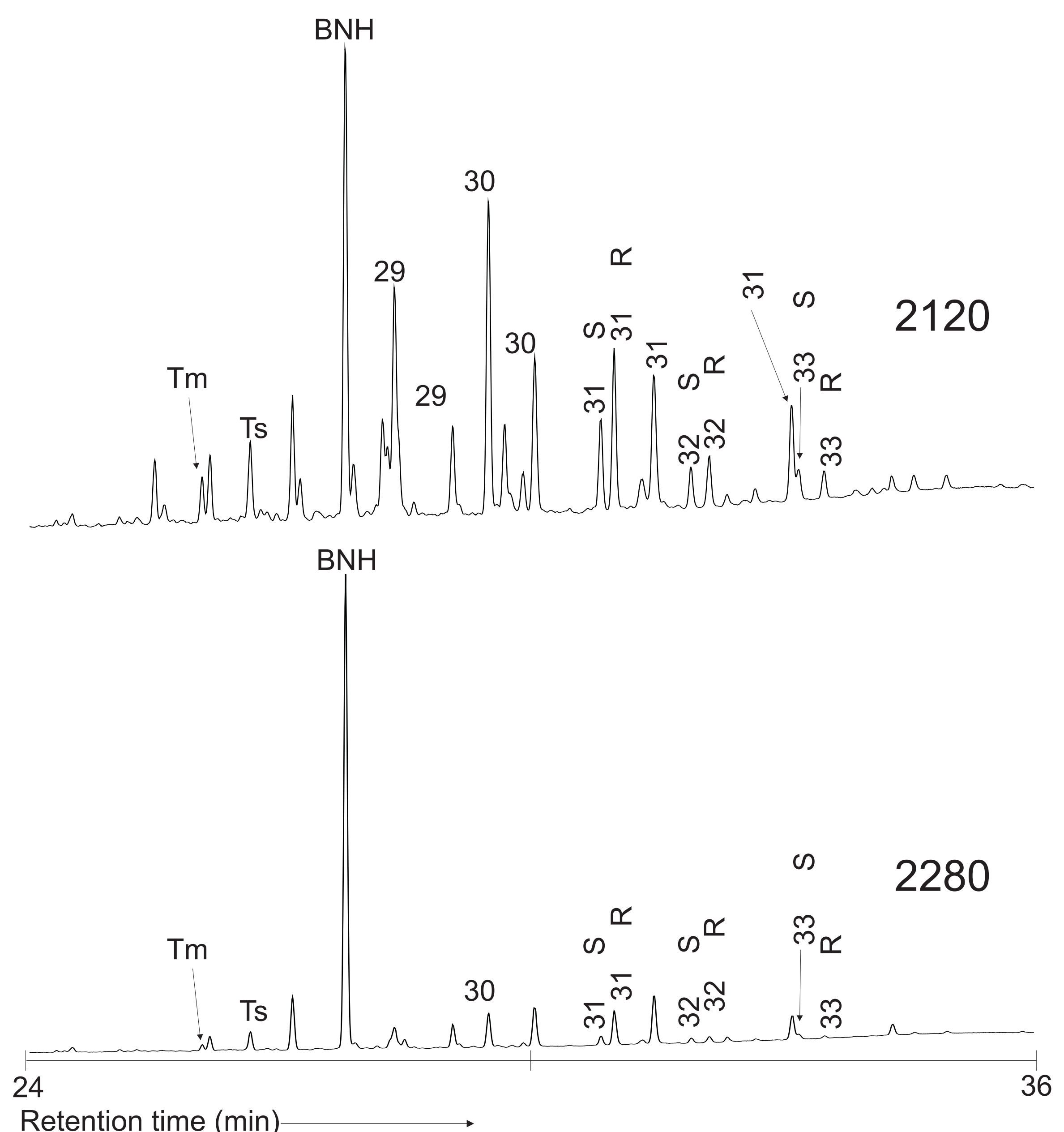


Figure 3: Partial mass chromatogram (m/z 191) at the PETM carbon isotope excursion and above (2280 and 2120 respectively).

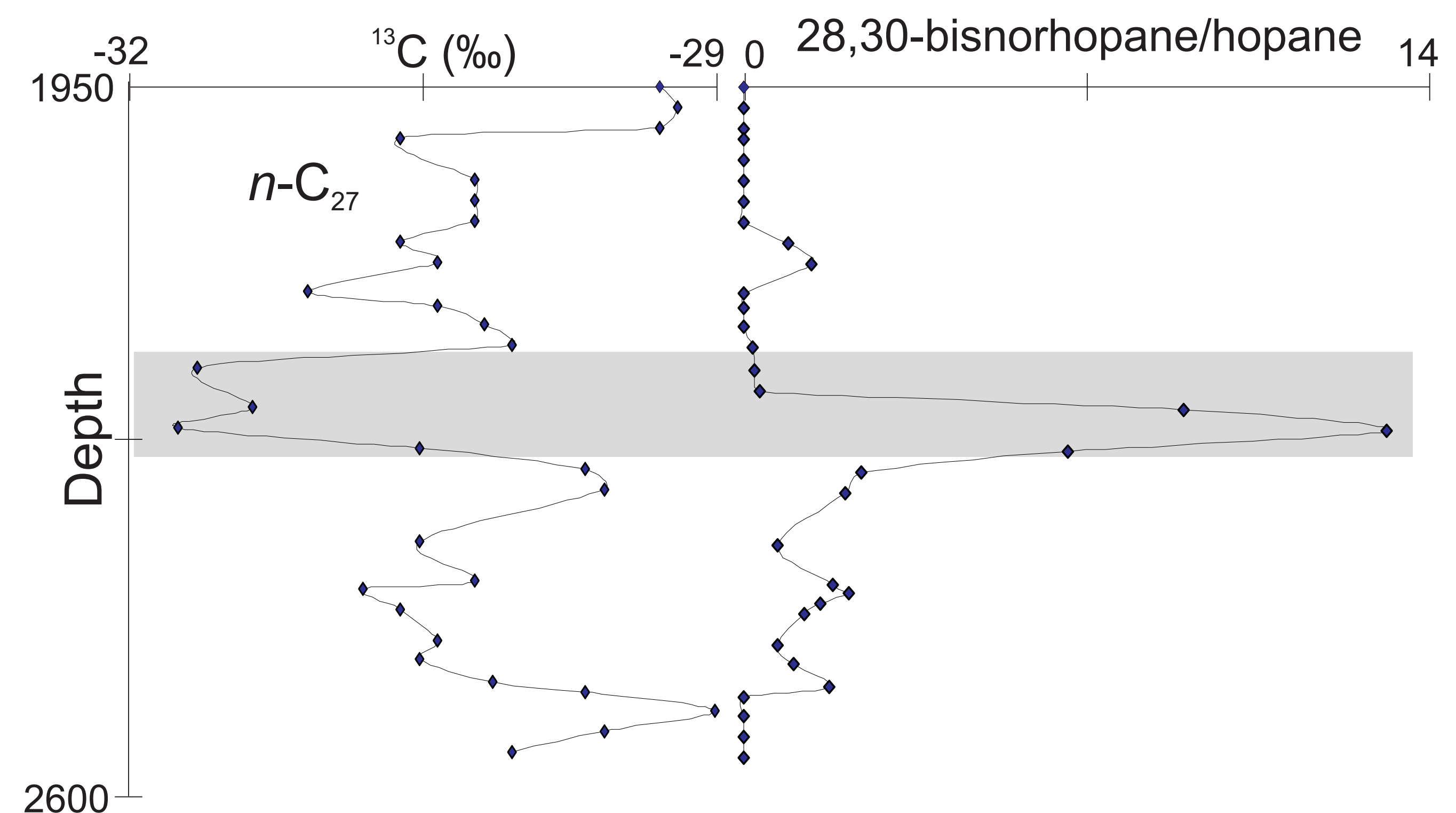


Figure 4: Plot of ¹³C of *n*-C₂₇ and the ratio of 28,30-bisnorhopane/hopane against depth. PETM is highlighted by shaded area.